Evaluation of the In-School Tobacco Use Prevention Education Program, 2007-2008

California Tobacco Control Program

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November 2010

California Department of Public Health
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McCarthy, W.J., Dietsch, B.J., Dent, C. (2010). Evaluation of the In-School Tobacco Use Prevention Education Program, 2007-2008. Sacramento, CA.

Content

Summary

- The prevalence of current tobacco use (cigarettes, smokeless, cigar use) among California youth appears to be stable from 2005-2006 to 2007-2008.
- From 2005-2006 to 2007-2008, anti-smoking attitudes, beliefs, and social environments among high school students became stronger while attitudes about the tobacco industry became less negative over time.
- Because student tobacco use rates in other states are falling while California student tobacco use rates are stable, the California high school smoking rates (12.5 percent for girls; 95 percent CI: 11.6-13.4; 16.9 percent for boys; 95 percent CI: 15.8-18.0) are no longer lower than the rest of the United States and are significantly higher than corresponding rates in Utah (5.7 percent for girls; 9.3 percent for boys).
- Teachers who have taught Tobacco Use Prevention Education (TUPE) lessons in the past and those with more hours of TUPE instruction were more likely to have students report having learned lessons about tobacco, smoking prevalence, and refusal skills training than teachers without such experience.
- Teacher TUPE training, especially teacher preparedness to teach tobacco prevention lessons, was positively associated with students' reported exposure to TUPE-related information.
- Total teacher TUPE instruction time was negatively associated with students' estimates of peer cigarette use; it was positively associated with students' intent not to smoke in the future and with students' belief in the negative social consequences of smoking.
- Use of a published curriculum was associated with both decreased lifetime and current student tobacco use, an increased likelihood of students reporting their intent to not smoke, and protective anti-tobacco sentiments.
- High schools with competitive TUPE grants were more likely than other schools to offer cessation services and referrals to students, cover specific topics on tobacco use, and sponsor school-wide anti-tobacco activities.
- Results of the longitudinal analyses showed that TUPE-funded grantee high schools reported higher numbers of tobacco prevention-related activities (e.g., assemblies, cessation classes, etc.) compared to non-grantee schools at each time point.
- Evidence from the longitudinal analyses suggests that higher levels of school-level TUPE activities were associated with reduced student tobacco use and smoking intentions, but were not associated with many of the hypothesized intermediate tobacco use precursors such as tobacco industry attitudes and perceived social consequences of tobacco use.
- The association of school TUPE activities with changes in student smoking was not explained by contextual factors such as enrollment size, socio-economic characteristics, or non-school-based tobacco control activities.
- At each time point, teacher reports of district support for school TUPE activities were higher for schools with TUPE funding than for schools without TUPE funding. District support, in turn, was associated with students' reports of both having received TUPE-related information, and having judged the information to be useful. District support was also associated with improved student tobacco use outcomes.

Introduction

The 2007-2008 In-School Evaluation of Tobacco Use Prevention Education (TUPE) Programs (IETP) was conducted to fulfill the enabling legislation requirements of Proposition (Prop) 99 (Assembly Bills 75, 99, and 816; and Senate Bill 391). Current pertinent legislative language requires that the California Department of Public Health (CDPH), California Tobacco Control Program (CTCP) evaluate the effectiveness of school-based TUPE programs in California. This particular evaluation focused on school-based tobacco use prevention activities in 156 randomly sampled schools (135 high schools and 31 middle schools) that participated in the survey. The high schools included the 53 of 65 high schools that participated in the 2003-2004 IETP and agreed to participate in 2007-2008. The guidelines for evaluating the programs outlined in the California Health and Safety Code Section 104375 call for an assessment of school-based tobacco use prevention activities and measurement of student responses to these activities. The evaluation was intended to measure the extent to which programs funded under Prop 99 promote two major goals: protection of nonsmokers and children from secondhand smoke, and reduction of tobacco usage by adults and youth.

This report is the seventh biennial report conducted by CTCP. Most questions included in the 2007-2008 IETP were taken from previous evaluations to permit comparability of findings across reports. This newest IETP collected extensive information on adolescent tobacco use and its correlates (e.g., attitudes, exposure to media, social norms) through the in-school administration of the 2007-2008 California Student Tobacco Survey (CSTS). The evaluation also collected data on beliefs and knowledge about tobacco education program implementation and prevention efforts from teachers, school administrators, school TUPE/health coordinators, and district TUPE/health coordinators. The current report uses data from all these sources to examine TUPE program implementation and program effectiveness.

This evaluation focused on four broad cross-sectional research questions and three broad longitudinal cohort questions with regard to youth tobacco use and prevention in California during the 2007-2008 school year. The school-longitudinal component consisted of a re-assessment of 48 high schools and birth cohorts within those schools, which were originally part of the 2003-2004 IETP evaluation sample.

Background

Prior to 1994, the California Department of Education (CDE) allocated school-based TUPE funds on an entitlement basis to all schools that served students in grades K through 12. Since 1994, CDE has allocated school-based TUPE funds to school districts using two different mechanisms. First, funds for TUPE programs in grades 4 through 8 have been allocated to districts on an "entitlement basis" (i.e., all schools in tobacco-free school districts serving students in grades four through eight received funding for tobacco use prevention services based on average daily attendance). Second, a "competitive grant" process was used to allocate funds for programs in grades 9 through 12; and, more recently, for innovative programs in grades 6 through 8. Districts with multi-faceted programs with measurable objectives, strong rationale for interventions, high levels of community and school involvement, high quality monitoring and evaluation activities, and highly qualified personnel are more likely to receive competitive grants than other districts.

Both entitlement and competitive program funds are required to support tobacco-specific instruction, reinforcement activities, special events, and cessation programs for students. IETP provides information from data collected in districts supported by both of these mechanisms, with particular attention paid to schools with competitive grants. Particular attention was paid to schools with competitive grants because their additional TUPE resources, compared to non-TUPE award schools, were expected to yield measurable improvement in TUPE outcomes. Because TUPE funds were allocated more evenly among middle schools, there was less expectation that differences would be observed between middle schools in relation to TUPE funding.

Evaluation Questions

This section reviews answers to questions in four general areas, in conformity with the evaluation questions outlined in the original Request for Proposals. The questions are listed below and summaries of their answers are then addressed sequentially throughout the rest of this report.

(1) (a) How do current California students compare to past California students on tobacco use, knowledge, and attitude?

(b) How do the current California students compare to students in the rest of the United States on these measures?

(2) (a) Are the relationships between inputs, such as TUPE funding and administrative support, related to the short-term outcomes?

(b) Are the Short-, Intermediate-, and Long-term outcomes related to each other?

(c) Are the Short-, Intermediate-, and Long-term relationships stronger based on their Inputs?

(d) What is the relative strength of measured inputs compared to external factors?

(3) (a) How do schools in the state compare to the federal CDC and USDE guidelines?

(b) Does the TUPE school program structure and implementation change over time?

(4) Is a school implementation index related to students' tobacco use, knowledge, and attitudes over the four-year period?

Evaluation Findings

(1) (a) How do current California students compare to past California students on tobacco use, knowledge, and attitudes?

The prevalence of current tobacco use (cigarettes, smokeless, cigar use) among California youth declined relative to rates reported in 2005-2006, bringing them closer to current tobacco use rates in 2003-2004.

For example, current cigarette use varied across 2003-2004, 2005-2006, and 2007-2008 in grade 7 as: 4.2 percent, 5.1 percent, and 4.9 percent, respectively; in grade 8 as 6.6 percent, 9.3 percent, and 8.8 percent, respectively; in grade 9 as 9.3 percent, 11.2 percent, and 10.5 percent, respectively; and in grade 10 as 13.1 percent, 14.9 percent, and 13.2 percent respectively. The corresponding middle and high school prevalence rates for these time points were 3.9 percent, 6.1 percent, and 6 percent in middle school, and 13.2 percent, 15.4 percent, and 14.6 percent in high school. Prevalence of youth tobacco use remains generally low in California compared to a decade earlier, but increases with each successive grade, more than doubling from middle school to high school.

Youth tobacco use is more prevalent among boys and among Caucasians. There appear to be urban versus rural regional differences in lifetime and current overall tobacco use, with the Central Valley area of California (e.g., Fresno) exhibiting the highest lifetime smoking prevalence (have you ever smoked?) at 42 percent and the highest current overall tobacco use (current smoking + smokeless) of 20 percent. By contrast, the Los Angeles area exhibited the lowest rates (34 percent lifetime and 14 percent current overall tobacco use).

A majority of California youth reported that they "definitely would not" smoke in the following year (76 percent of middle school students and 60 percent of high school students). Of those who currently smoke, 30 percent expressed a desire to quit for good.

Nearly 30 percent of lifetime and current smokers reported a desire to quit smoking cigarettes and approximately one out of ten smokers have participated in available cessation programs, including the California Smokers' Helpline. Fifty-six percent of smokers who participated in available quit-smoking programs did so at their school. Of those smokers who used a quit-smoking program off-campus, 39.6 percent said that what they used was the 800-NO-BUTTS California Smokers' Helpline (the Helpline).

African American smokers were particularly likely to use smoking cessation resources. For instance, 9.2 percent of African American ever-smokers used the Helpline compared to less than 5.2 percent of ever-smokers from any other ethnic group (number of ever-smokers ranged from 24 to 149). Other studies have shown some student smokers to be averse to using school-based cessation resources but open to using existing cessation resources in the community, such as Freedom from Smoking programs sponsored by partners of the American Lung Association (ALA) (Leatherdale, 2006).

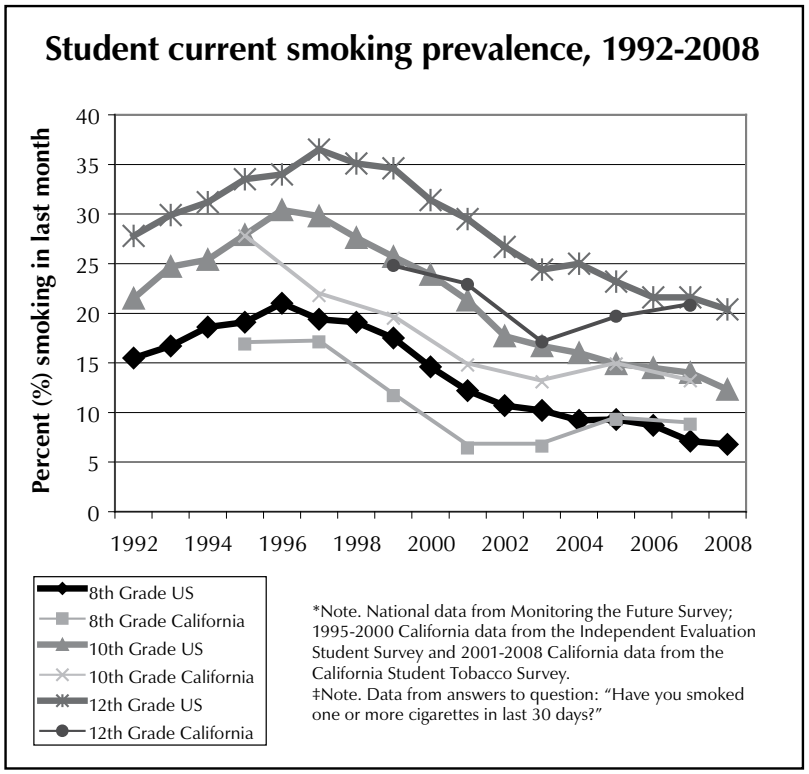
The findings concerning tobacco use-related attitudes and beliefs are generally but not always consistent with the findings in the 2005-2006 CSTS. The majority of California's young people continue to report negative perceptions about tobacco use. Girls, in comparison to boys, were more likely to report believing in the harmfulness of tobacco. High school students reported higher prevalence estimates of peer tobacco use than middle school students, a finding consistent with the corresponding findings in the 2005-2006 IETP. New analyses looking at social influences, such as whether smoking makes a person look cool, across smoking status confirmed that smokers were more likely than nonsmokers to believe that smoking makes a person look cool. The perception, reported by students, that the content of tobacco use prevention messages focuses more on the physical consequences of tobacco use than on social resistance skills or use of peer leaders to help students quit smoking may represent lost opportunities for prevention. This may also help explain the linear decline with increasing grade of students' perception that tobacco use information provided by their school contributed to their decision not to smoke.

The majority of California youth were not regularly exposed to secondhand smoke. They were also not exposed to tobacco smoke in a room or car, although the rates were substantially lower for high school students (57 percent) for non-exposure to tobacco smoke in a room compared to middle school students (69 percent). Eighty percent of middle school and high school students reported that, during the past week, they were not in a room at home with someone smoking cigarettes. Slightly fewer high school youth (77 percent) than middle school youth (82 percent) responded that they had not been in a car with someone who was smoking during the past seven days. Midway through the survey, on January 2008, a new California law took effect, prohibiting smoking in cars when minors are passengers. The percentage of high school students reporting having been in a car in the last seven days, when someone was smoking, dropped a significant fourteen percent from 2005-2006 to 2007-2008. There was a significant three-percentage point increase from the 2005-2006 IETP report among high school students reporting that they had not been exposed to cigarette smoking at home.

As was found in the third wave of the Independent Evaluation Student Survey and the three subsequent biennial IETP surveys, the prevailing attitude among both middle and high school students has been strongly negative regarding the tobacco industry. The most negative attitudes were about whether or not tobacco companies try to get people addicted to tobacco, although attitudes were only slightly higher for high school students compared to middle school students. These numbers were not substantially different from the 2005-2006 data.

(b) How do the current California students compare to students in the rest of the United States on these measures?

After years of decline, the prevalence of current tobacco use (cigarette, smokeless, cigar use) among California youth has plateaued even though it continues to decline in the rest of the United States. The result is that the historically lower youth tobacco use rates in California have now converged with corresponding national rates. California 8th, 10th, and 12th graders now report current (30-day) rates (8.8, 13.2, and 20.7 percent, respectively) that non-significantly exceed the corresponding rates for 8th, 10th, and 12th graders in a 2008 national survey on drug use (6.8, 12.3, and 20.4 percent, respectively) (See Figure 1). The 2007-2008 CSTS results indicated a slight continuing trend towards reduced adolescent tobacco use experimentation among California in-school youth but showed negligibly reduced prevalence in regular tobacco use, smokeless tobacco use, and cigar use by high school students. California's current middle school smoking rates have also now converged with corresponding national rates and are not statistically different from national rates.



Results from the 2007-2008 CSTS confirmed the National Youth Tobacco Survey (NYTS) findings showing that high school students were only slightly less likely than middle school students to deny that smoking could make someone look cool and help them fit in socially (75 percent versus 78 percent, respectively). When looking at the results by gender, the 2007-2008 CSTS patterns were similar to those of 2006 NYTS-U.S. in showing that a higher proportion of girls than boys responded "definitely not" when asked whether smokers looked cool. Both girls and boys showed a small drop from 82 and 75 percent (middle school) to 79 and 71 percent (high school), respectively.

Contrary to previous United States-to-California comparisons, it is now the United States middle school students who are (slightly) more strongly convinced that exposure to second hand smoke is harmful (70 percent in United States middle schools versus 68 percent in California middle schools). More consistent with past history, California high school students more strongly recognized (72 percent) the perceived harmfulness of exposure to secondhand smoke than did their United States counterparts (70 percent).

Fortunately, the overall pattern of results shows that the average California student attitude remained generally consistent with low rates of tobacco use, particularly in the younger grades. Two worrisome trends, however, cloud the future for California youth with respect to avoiding tobacco addiction. One is that California youth now report beliefs that are weaker than students, nationally, regarding the harmfulness of exposure to second-hand smoke and the safety of smoking for only one or two years. California students versus students, nationally, also less strongly deny that smoking helps people look cool. The second is a tendency for California students to hold weaker anti-tobacco beliefs as they progress from middle school to high school.

(2) (a) Are the relationships between inputs, such as TUPE funding and administrative support, related to the short-term outcomes?

Within time, but not across time, TUPE funding was positively associated with TUPE activities (e.g., school assemblies), desired outputs, (e.g., more TUPE training of teachers) and short-term outcomes (e.g., student anti-tobacco attitudes). The associations were generally large and positive, with most reaching statistical significance. TUPE funding status was positively associated with increased TUPE instruction, increased parent involvement, increased school provision of cessation services, and increased measure of global TUPE implementation.

Although generally positive, none of the funding impacts on TUPE activities over time were significant. The results suggest that TUPE grantee schools started out at higher rates of TUPE implementation, and maintained or slightly increased their implementation level advantage over the examined time period.

TUPE funding was positively associated with teacher-reported district support for school TUPE activities. Teacher-perceived district support for TUPE, in turn, was positively related to an overall index that measured the extent to which the school implemented tobacco control recommendations, with more support associated with increased TUPE activity. More specifically, increased district support was associated with increased breadth of coverage of the school's no-tobacco use policy (e.g., covering adults as well as students) and with increased overall implementation of TUPE activities.

There was surprisingly little association between measures of TUPE implementation and various precursors of smoking. Neither positive nor negative social consequences nor physical consequences of smoking were associated with measures of TUPE implementation. Neither pro-tobacco industry nor anti-tobacco industry attitudes were associated with measures of TUPE implementation. They appeared to be unaffected by exposure to school TUPE activities as measured by an overall index that measured the extent to which the school implemented tobacco control recommendations.

(b) Are the Short-, Intermediate-, and Long-term outcomes related to each other?

When evaluating the data collected in 2007-2008, results of analyses suggest that the number of school-wide tobacco prevention activities that took place at schools during the year prior to the survey was unrelated to most of the student tobacco use outcomes and unrelated to most tobacco use precursors. Two exceptions were the findings that teacher-reported numbers of school-wide TUPE activities were positively related to students' endorsement of anti-cigarette industry norms and positively related to their likelihood of perceiving smoking as physically harmful.

Examination of the school-level changes in tobacco use precursors from 2005-2006 to 2007-2008 showed only two changes in tobacco use precursors. One change was a significant reduction in students' reported number of friends who smoked over time with increasing level of TUPE activities. The other change was a significant reduction in students' endorsement of pro-smoking tobacco industry attitudes with increasing level of TUPE activities.

(c) Are the Short-, Intermediate-, and Long-term relationships stronger based on their Inputs?

There were significant changes between 2005-2006 and 2007-2008, such that higher levels of school-wide tobacco prevention activities were associated with subsequently decreased student tobacco use. These effects of TUPE activities were not immediately apparent, however, inasmuch as no significant correlations were seen when examining only the 2005-2006 data or only the 2007-2008 data.

Many tobacco use outcomes were not affected by level of perceived district support for TUPE teaching or for school TUPE activities, but there were, nonetheless, five instances where district support for TUPE did matter. When teachers reported that their district expected them to teach tobacco-related lessons, their students were significantly less likely to report any lifetime cigarette use but significantly more likely to report an intent to not smoke, ease of cigarette refusal, and anti-cigarette industry attitudes. Students in schools where teachers reported district support of school TUPE activities were more likely to report accurate peer smoking norms.

Teacher reports of TUPE instruction hours were associated with three different student tobacco use precursor outcome measures, confirming 2005-2006 findings that teacher TUPE instructional time is an important predictor of student tobacco use precursor outcomes. For example, total teacher TUPE instruction time was negatively associated with students' estimates of peer cigarette use. Moreover, it was positively associated with protective beliefs about the negative social consequences of smoking and with the students' intent to not smoke.

We found an association between the use of a published or non-published tobacco use prevention curriculum and student tobacco use outcomes. Use of a published curriculum was found to be associated with decreased lifetime and current cigarette use and increased likelihood of students reporting their intent to not smoke, ease of cigarette refusal, beliefs about the negative social consequences of smoking, anti-cigarette industry attitudes, and perceived physical harm from smoking.

(d) What is the relative strength on measured inputs compared to external factors?

External factors that could potentially confound the relationship between TUPE global implementation and smoking behavior were evaluated in a series of hierarchical linear models predicting the smoking index, both cross-sectionally (the average of the two time points) and as predictors of changes in smoking. These external factors included parent education, average student academic achievement level of the school, school enrollment size, and the percentage of students eligible for free and reduced price lunches. Student-reported participation in or awareness of community tobacco control activities, police enforcement of restrictions on tobacco sales to minors and on tobacco product possession by minors was associated with smoking cross-sectionally but not with changes in smoking over time. Student reports of exposure to anti-tobacco messages on radio, television, or outdoor media were also related to smoking prevalence both in the 2005-2006 data and the 2007-2008 data but not correlated with changes in youth smoking between 2005-2006 and 2007-2008.

Of the examined school demographic factors (e.g., parent education, percent of students eligible for free or reduced price lunches), none of them were reliably associated with changes in student smoking over time. The negative association of the school TUPE Activities Index with smoking behavior remained statistically significant after including all school demographic factors, suggesting a real benefit of TUPE implementation on reducing student smoking. This would indicate that these contextual factors do not confound the observed relationship of school TUPE activities to changes in the prevalence of student smoking within the birth cohort sample.

(3) (a) How do schools in the state compare to the federal CDC and USDE guidelines?

Qualitative assessments [mostly telephone interviews with District (n=18) and school TUPE coordinators (n=13)] of adherence to the U.S. Department of Education's Principles of Effectiveness demonstrated increased fidelity to science-based tobacco use prevention education programs. More school staff were aware of science-based programs; in the survey of teachers, more than twice the proportion (38 percent) reported using a science-based program in 2007-2008 than reported using a science-based program in 2005-2006 (18 percent).

Schools were evaluated with respect to compliance to six guidelines for effective school tobacco use prevention issued by the Centers for Disease Control and Prevention (CDC). These guidelines included: 1) Develop and enforce a school policy on tobacco use; 2) Provide instruction about the negative physiologic and social consequences of tobacco use, social influences on tobacco use, peer norms regarding tobacco use, and refusal skills; 3) Provide developmentally appropriate tobacco use prevention education in K-12; 4) Provide program-specific

training for teachers; 5) Involve parents or families in support of school based tobacco use prevention programs; 6) Support cessation efforts among students and all school staff who use tobacco (CDC, 1994). There was more than 80 percent agreement among adult school staff about the existence of school tobacco use prevention policies and their application to teachers and students; there was less consensus about whether these policies applied to visitors. The responses were similar to those reported for teacher and administrator respondents in the 2005-2006 IETP report.

With respect to CDC-recommended content in a tobacco use prevention education curriculum, there was high agreement among district and school staff that only science-based programs should be used. There was, nonetheless, some disparity between district TUPE coordinators (96 percent) and school TUPE coordinators (62 percent) reporting actual use of science-based programs, a disparity that was noted in the previous report as well. It does, however, appear that a greater number of schools receiving TUPE competitive grant funding, compared to non-grantee schools, are using science-based programs. This is particularly evident for the readiness-to-quit and cessation programs.

The CDC Guidelines listed several topics that have been found to be important components of effective tobacco use prevention programs. Health effects of tobacco, tobacco advertising, and marketing were the most widely named topics across adult respondents. However, only 35 percent of teachers who taught tobacco use prevention lessons in the past year included a discussion of general, personal, and social skills as one of the topics. The primary method of instruction still seems to be classroom discussion and lecture; almost all school staff reported use of these methods. A truly effective TUPE program should feature all of the recommended TUPE curriculum components but relatively few teachers reported employing the most interactive of the recommended components, role-playing. Increased teacher training in how to conduct TUPE lessons might remedy this problem. Additionally, information about the science-based rationale for selecting the curriculum and the importance of fidelity of implementation should be essential components of the TUPE training curriculum.

Twenty-three percent of school coordinators and 18 percent of teachers reported receiving one or more days of in-service training for tobacco use prevention, with 22 percent of teachers reporting that they were trained to deliver a specific published tobacco curriculum. These numbers are slightly lower than the numbers reported in the previous 2005-2006 IETP report. However, a greater proportion of school coordinators reported that they felt prepared to teach tobacco use prevention (49 percent), a 6 percent increase from the corresponding findings two years earlier.

School staff members differ widely in their adherence to the CDC recommendation to involve parents in TUPE activities. Seventy-one percent of school administrators and 52 percent of school TUPE coordinators reported sending TUPE materials home to parents but less than seven percent of teachers reported involving parents in TUPE activities. This may reflect the difficulty that teachers generally have in involving parents in any optional school-based activities (Hemann & Earle, 2000), particularly low-income, single parents (Kohl et al., 2000). This is concerning because the published literature makes it clear that parents are important influences on their children's proclivity to take up the tobacco use habit (Distefan et al., 1998; Simons-Morton et al., 2001). What is not so clear is whether schools have the necessary resources and strategies to effectively capitalize on this acknowledged impact of parents on their children's tobacco use habits (Seitsinger et al., 2008).

With respect to the CDC recommendation for schools to offer cessation classes, about half of the schools seem to have some type of smoking cessation resource on campus available for students. About a third of school staff

reported that there were resources for staff or teachers if they wanted help in quitting their tobacco use. These rates are lower for school coordinators and school administrators than corresponding rates observed in the 2005-2006 IETP.

Typically, high schools are more likely than middle schools to offer onsite cessation programs, because there are relatively few regular student smokers in grades 6-8 compared to the number of student smokers in grades 9-12. It is not unusual for schools to collaborate with community-based agencies to provide services that are more successfully conducted away from the school setting. For example, ALA, local tobacco control programs, and other health-related agencies provide tobacco-related services, including cessation.

In short, there is mixed adherence by schools to the U.S. Department of Education Principles of Effectiveness and to the CDC's Guidelines for School-based tobacco use prevention. On the positive side, use of science-based TUPE curricula is increasing and more teachers report teaching the science-based TUPE curricula with fidelity. On the negative side, fewer teachers appear to be getting trained to teach TUPE classes or trained to use a specific TUPE curriculum. With the elimination of TUPE entitlement funding it is likely that there will be an accelerated decline in the number of teachers reporting having received TUPE training in the last year. As fewer teachers receive TUPE training, adherence to other CDC recommendations is likely to decline because teachers will not have the necessary skills to carry out the recommendations. These include the recommendations to involve parents in TUPE activities, and to use interactive strategies to engage students more effectively in TUPE instruction.

(b) Does the (TUPE) school program structure and implementation change over time?

As previously described changes in TUPE activities and in student tobacco use were studied in the same 48 schools from 2001 through 2008, to prospectively examine the impact of TUPE activities on student tobacco use. This immediate question focused only on whether TUPE activities changed systematically from 2003 through 2008 in these 48 schools.

School staff described an array of tobacco use policy and practice measures comprising their school's TUPE program. The investigators constructed multi-item summary indices from these measures by standardizing the sum of the items listed in each of the six broad conceptual areas of school-based tobacco use prevention/intervention services: 1) no-tobacco use policies; 2) tobacco-related instruction; 3) school-wide anti-tobacco activities; 4) cessation activities; 5) parent involvement; and 6) governance/support. The summary measures used the reports of school tobacco use prevention coordinators and in the case of the instructional area, additional reports from teachers who had taught tobacco lessons were used.

A Policy Index was comprised of the breadth of policy, enforcement of no-tobacco use policy, and the use of supportive policy items. An Instructional Index was comprised of tobacco use prevention lesson hours, use of published tobacco use prevention curricula, breadth of topics covered, use of novel teaching modalities, and TUPE training items. An Activities Index was comprised of the number of in-school TUPE activities outside of the classroom. A Parent Involvement Index was constructed from items measuring the extent of parent involvement in tobacco prevention activities. A Cessation Services Index consisted of the one item indicating the provision or referral of that service at school. And finally, the items referring to support from the district for tobacco related activities defined a District Support Index.

The first five indices were further combined to form a Global School TUPE Implementation Index. Higher scores on the global index (and each of the sub indices) indicated more implementation of activities thought to directly affect proximal and medial-distal tobacco use-related outcomes. The stability of these indices was examined across the time period: 2005-2006 to 2007-2008 using a longitudinal cohort of 48 high schools that participated in every cycle since 2003-2004. All indices showed small declines over time in TUPE activities, but none of the declines were significant.

The investigators examined the impact of TUPE funding status on the summary TUPE implementation measures and further examined whether TUPE funding resulted in changes in TUPE implementation over time, controlling for region, school enrollment size, and school ethnic composition.

Within both the 2005-2006 data and the 2007-2008 data, the impact of TUPE funding on such component indices as parent involvement, TUPE activities, TUPE classroom instruction, etc., was generally large and positive, with all but the Policy Index reaching statistical significance. In other words, schools with TUPE funding in 2005-2006 had higher levels of parent involvement, TUPE activities, TUPE classroom instruction, etc. than schools without TUPE funding. The same pattern was observed in 2007-2008. By contrast, although generally positive, none of the funding impacts on index changes over time were significant. In other words, increases in a school's TUPE funding from 2005 through 2008 were not significantly related to component indices of TUPE activities. The results suggest that TUPE grantee schools started out at higher rates of TUPE implementation and maintained or slightly increased their implementation level advantage over non-grantees during the examined time period.

The impact of TUPE funding on the district level and potential change in perceived district support was also examined. The results demonstrated that the perception of district support was associated with TUPE funding at each time point. That perception tended to increase somewhat in the grantees (and decrease in non-grantees over time but the impact of these grantee/non-grantee-specific changes in perceived district support was not statistically significant.

Next, district support was considered as an input to implementation activity, that is, implementation indices (and their changes over time) were examined as a function of district support. As might be expected, district support was positively related to all of the implementation indices, with more support associated with increased TUPE activity. However, only the TUPE policy and TUPE activities indices, and the overall TUPE implementation index reached statistical significance. There was no impact of perceived district support for TUPE on changes in any of the TUPE indices over the time period: 2005-2008. One can speculate that while school districts may differ greatly in support for TUPE at any one time point, changes in school district support for TUPE across time are typically small and therefore do not result in big changes in TUPE activities over the time period, 2005-2008.

In support of these conjectures, consistent associations were found between these inputs and implementation outputs at each of the separate time points, in 2005-2006 and then again, in 2007-2008. The investigators determined that the grantee schools in this sample have had TUPE funding for an average of 114 months (nine and half years). Given this, the fact that they had significantly higher levels of TUPE activity than non-grantee schools is reassuring and expected. Similarly, the fact that TUPE grantees did not change their higher levels of TUPE activity and non-grantees did not change their lower levels of TUPE activity in the absence of any impetus to do so (i.e., changes in their funding or programmatic initiatives) was also not surprising. Because TUPE funding

status was related to perceived district support, which in turn was related to levels of school activities, it is logical to assume that district support is one mechanism by which TUPE funding affects TUPE practice.

(4) Is a school implementation index related to students' tobacco use, knowledge, and attitudes over the four year period?

The results of the school and birth cohort analyses using data collected twice from the same high schools in 2005-2006 and 2007-2008 largely were consistent with the results obtained from the cross-sectional data collected in 2007-2008. The cohort analysis confirmed that high school student tobacco use remained relatively stable over the two-year period, including cigar and smokeless tobacco use.

Student pro-smoking attitudes, beliefs, and social environments (intent to smoke, belief of more smoking peers) remained stable, while anti-smoking health beliefs and beliefs about the positive social consequences of tobacco use decreased over the two-year period. Students also expressed both stronger positive attitudes and stronger negative attitudes about the tobacco industry over the two-year interval.

There was little evidence of overall change in the type and level of school TUPE implementation between the 2005-2006 and 2007-2008 academic years. TUPE-funded high schools reported consistently higher levels and quality of tobacco prevention-related activities compared to non-grantee schools at each time point. These TUPE-funded implementation advantages appeared to be mediated by perceived district-level support for TUPE activities, which, in turn, was associated with school TUPE funding status.

The longitudinal evidence suggests that the number of school-level tobacco prevention activities was associated with changes in student tobacco use and intentions, but not with some of the hypothesized medial-distal tobacco use precursors such as student estimates of the number of peers who use tobacco or the number of friends who use tobacco. Among the precursors to smoking, only student-reported intentions to smoke and students' perception that positive social outcomes could be expected from tobacco use were predictive of school-level changes in smoking between 2005-2006 and 2007-2008.

The contextual factors examined in this analysis, such as average parent education and percentage of students eligible for government-subsidized school meals, were not found to be significant predictors of change in the prevalence of student tobacco use during this period. The school TUPE Activities Index alone had a statistically significant coefficient for predicting changes in the prevalence of student smoking over time. When the contextual factors were included in the model, the school TUPE Activities Index alone was still statistically significant and is suggestive of a benefit of TUPE implementation on reducing student smoking. It was concluded that the association of school TUPE activities with changes in student smoking could not be explained by the contextual factors examined in this analysis.

The finding that investment of TUPE resources in schools is associated with subsequent lower student tobacco use prevalence, compared to schools without such resources, confirms a similar finding reported in the previous IETP final report. In light of the foregoing results, this now twice-confirmed result is the strongest evidence to date that school-level tobacco use prevention education is effective in reducing student tobacco use.

The Whole Picture: Combining Results from 2003-2004, 2005-2006, and 2007-2008

Forty-eight schools (74 percent) out of the 65 originally surveyed in 2003-2004 also participated in the IETP in 2005-2006 and 2007-2008. The pattern of findings for results based on three assessments largely replicated the pattern described for the most recent two-assessment comparison: 2005-2006 versus 2007-2008. In particular, State TUPE funding is related to increases in TUPE activities, which, in turn, are related to decreased student tobacco use.

This report confirms and extends to 2007-2008, the suggestive finding of Park and her associates (Park et al., 2010) based on a 2003-2004 versus 2005-2006 comparison that TUPE funding affects school TUPE activities, which, in turn, affects student tobacco use rates. The effect, while small, was found to persist even after including multiple potential confounders in the model.

A cautionary note, however, from the overall results is the statistically non-significant but consistently negative trends in school TUPE activities, reflective of the steady drop in per capita TUPE funding resources for such activities. Even though California's student tobacco use rates are stable rather than rising in the face of dwindling TUPE resources, there is no reason for complacency. California was once a leader in reducing youth tobacco use rates relative to all other states, with the exception of Utah. The most recent comparisons of California youth tobacco use rates with nationally representative estimates of youth tobacco use now show that youth rates have fallen in many other states, resulting in middling California youth tobacco use rates rather than exemplary.

Recommendations

More so in this report than in previous reports, it is clear that use of a published curriculum is associated with better student tobacco use outcomes. A lack of funds is the principal reason why school districts do not have sufficient copies of a published tobacco control curriculum. Without TUPE funding, schools are less likely to purchase published tobacco use prevention curricula. Schools may use alternate funds, federal Title 1 funds, for example, to support their tobacco control efforts; typically the resources that can be devoted to tobacco control are less than what would be possible through receipt of dedicated TUPE funding. Increased TUPE funding, then, is a recommended strategy for increasing teacher access to published tobacco prevention curricula.

As noted in a previous IETP report, the evidence suggests that school district administrators need to publicly support TUPE activities, to publicize this support regularly, and to indicate that TUPE instruction is as important as other academic instruction. Teachers' efforts will be more effective when they know that they have support from their administrators for their TUPE activities.

Future Research on Student Tobacco Use and TUPE

The finding that the global school TUPE implementation index influences prospective student tobacco use contrasts with the lack of effect of smoking precursors on student tobacco use. This suggests that other mediators in the relationship between school TUPE implementation and student tobacco use need to be identified and included in surveillance efforts and analysis. In contrast to findings reported in the last report, findings in the present report made it clear that non-TUPE school-level factors such as a school's average parent educational attainment and its Asian/Pacific Islander score were NOT empirically important confounders of the relationship between school TUPE implementation and the school's prevalence of student smoking. More research is needed to clarify under what conditions it is important to include school demographic characteristics in explanatory models.

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